




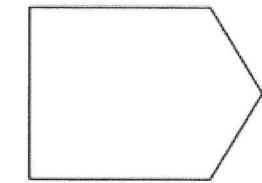


8.1 Classifying Polygons

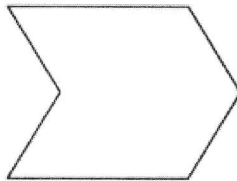
Goal: Describe polygons.

<p>Convex Polygon: a polygon in which no line that contains a side of a polygon passes through the interior of the polygon</p>	
<p>Concave Polygon: a polygon that is not convex. These <u>"cave in"</u> on themselves.</p>	
<p>Equilateral: a polygon where all <u>sides</u> are congruent</p>	
<p>Equiangular: a polygon where all <u>angles</u> are congruent</p>	
<p>Regular: a polygon that is both <u>equilateral</u> and <u>equiangular</u></p>	

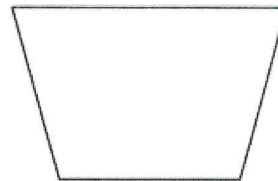
Decide whether the polygon is convex or concave.



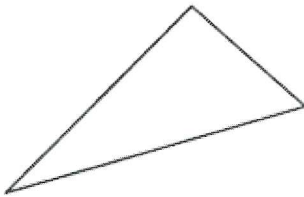
convex



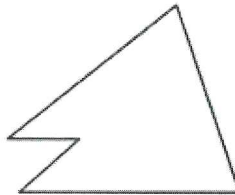
concave



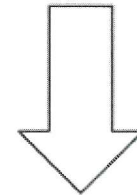
convex



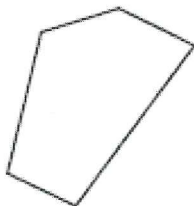
convex



concave



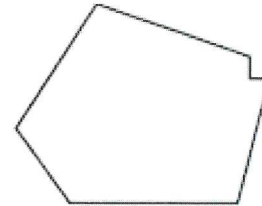
concave



convex

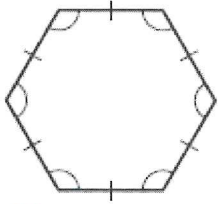


concave

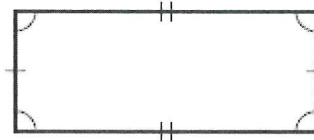


concave

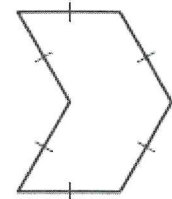
Decide whether the polygon is equilateral, equiangular, or regular. → Both



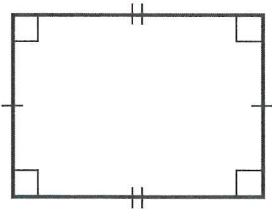
Regular



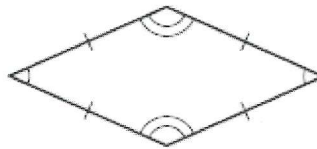
Equiangular



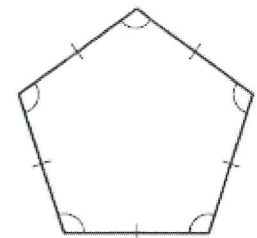
Equilateral



Equiangular



Equilateral



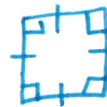
Regular

Draw the polygon described.

a) Equilateral but not equiangular



b) Convex and regular



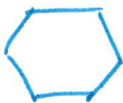
c) Convex but not regular



d) A concave hexagon



e) A convex hexagon

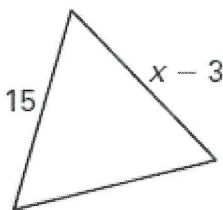


The polygons are regular. Find the value of x .

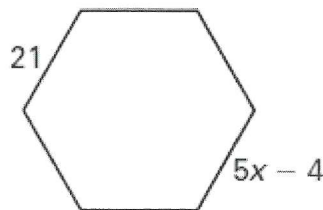
a) $x = \underline{18}$

b) $x = \underline{5}$

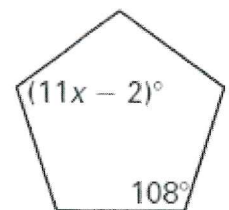
c) $x = \underline{10}$



$15 = x - 3$

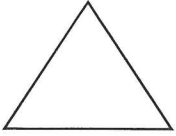
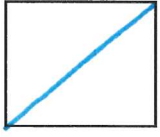
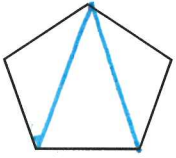
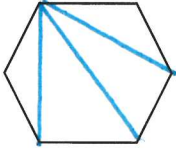
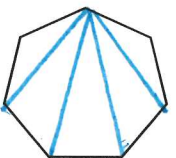
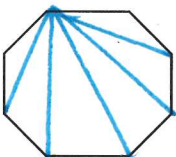
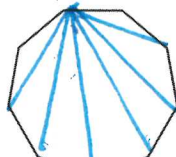
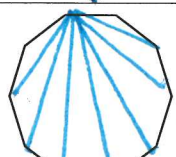


$21 = 5x - 4$



$11x - 2 = 108$
 $11x = 110$

8.2 – Discovering the Polygon Interior Angles Theorem

Name	Picture with Diagonals	Number of Sides	Number of Triangles Formed	Sum of Interior Angles
Triangle		3	1	180°
Quadrilateral		4	2	$2(180) = 360^\circ$
Pentagon		5	3	$3(180) = 540^\circ$
Hexagon		6	4	$4(180) = 720^\circ$
Heptagon		7	5	$5(180) = 900^\circ$
Octagon		8	6	$6(180) = 1080^\circ$
Nonagon		9	7	$7(180) = 1260^\circ$
Decagon		10	8	$8(180) = 1440^\circ$
n -gon		n	$n-2$	$(n-2)180$

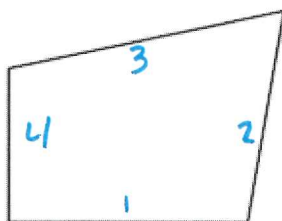
8.2 Angles in Polygons

Goal: Find the measures of interior and exterior angles of polygons

Polygon Interior Angles Theorem: The sum of the measures of interior angles of a convex polygon with n sides is $(n-2)180$

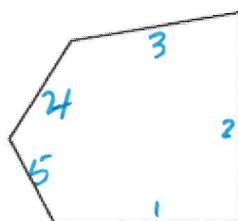
Find the sum of the measures of the interior angles of the polygons below.

a) 360°



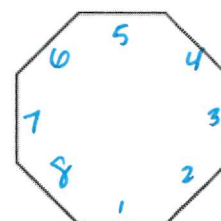
$(4-2)180$

b) 540°



$(5-2)180$

c) 1080°



$(8-2)180$

d) 1440°

Decagon

$(10-2)180$

e) 900°

Heptagon

$(7-2)180$

f) 2160°

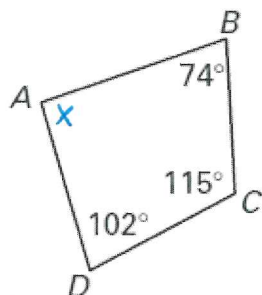
14-gon

$(14-2)180$

Find the sum of the measures of the interior angles, then find $m\angle A$.

a) Sum: 360°

$m\angle A =$ 69°

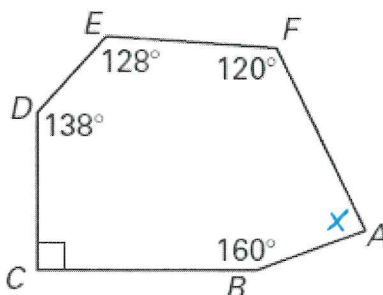


$(4-2)180 = 360$

$x + 74 + 102 + 115 = 360$

b) Sum: 720°

$m\angle A =$ 84°

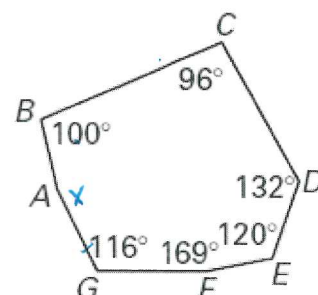


$(5-2)180 = 720$

$x + 120 + 128 + 138 + 90 + 160 = 720$

c) Sum: 900°

$m\angle A =$ 116°

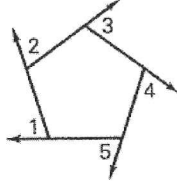


$(7-2)180 = 900$

$x + 116 + 100 + 120 + 132 + 169 + 100 = 900$

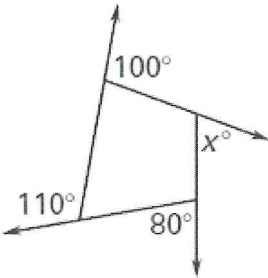
Polygon Exterior Angle Sum Theorem: the sum of the measures of the exterior angles of a convex polygon is

360°



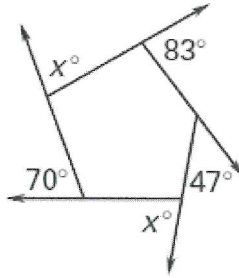
Find the value of x.

a) $x = \underline{10}$



$$x + 110 + 80 + 100 = 360$$

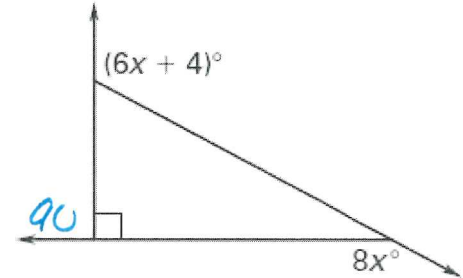
b) $x = \underline{80}$



$$x + 47 + 83 + x + 70 = 360$$

$$2x = 160$$

c) $x = \underline{19}$



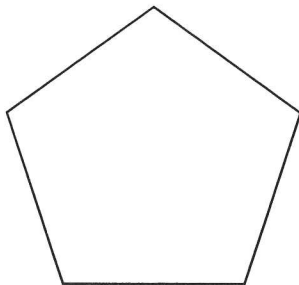
$$90 + 8x + (6x + 4) = 360$$

$$14x = 266$$

Find the measure of an interior angle of the regular polygon.

a) Sum: 540°

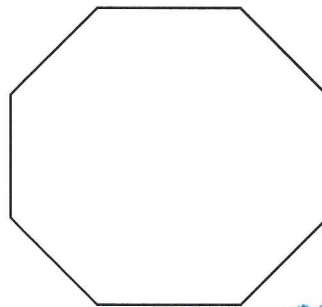
one $\angle = \underline{108^\circ}$



$$(5-2)180 = \frac{540}{5}$$

b) Sum: 1080°

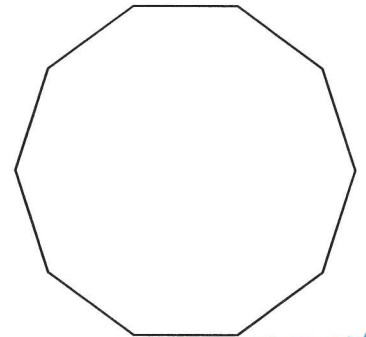
one $\angle = \underline{135^\circ}$



$$(8-2)180 = \frac{1080}{8}$$

c) Sum: 1440°

one $\angle = \underline{144^\circ}$

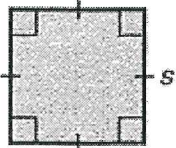
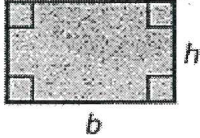


$$(10-2)180 = \frac{1440}{10}$$

8.3 Areas of Rectangles and Squares

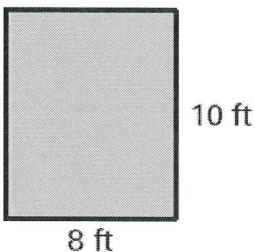
Goal: Find the area of rectangles and squares.

Area: the amount of Surface covered by a figure

Area of a Square	Area of a Rectangle
 <p style="text-align: center;">$A = s^2$</p>	 <p style="text-align: center;">$A = bh$</p>

Find the area. Label your answer.

a) $A = 80 \text{ ft}^2$



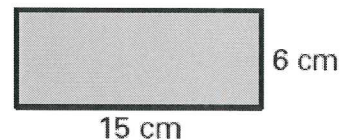
$A = 8(10)$

b) $A = 16 \text{ in}^2$



$A = 4^2$

c) $A = 90 \text{ cm}^2$



$A = 15(6)$

Sketch the figure and then find its area. Label your answer.

a) A square with side lengths of 4.25 ft.

Picture:



$A = 18.06 \text{ ft}^2$

b) A rectangle with a base of 1.4 in and a height of 2.5 in.

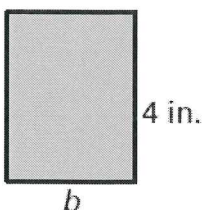
Picture:



$A = 3.5 \text{ in}^2$

A gives the area of the rectangle. Find the missing side length. Label your answer.

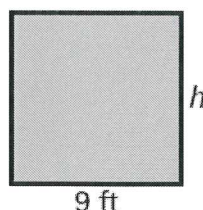
a) $b = 3 \text{ in}$



$A = 12 \text{ in}^2$

$\frac{12}{4} = \frac{b(4)}{4} \quad b = 3$

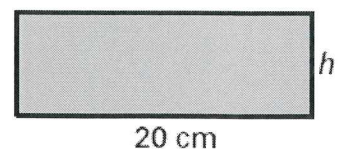
b) $h = 9 \text{ ft}$



$A = 81 \text{ ft}^2$

$\frac{81}{9} = \frac{9h}{9} \quad h = 9$

c) $h = 7 \text{ cm}$



$A = 140 \text{ cm}^2$

$\frac{140}{20} = \frac{20h}{20} \quad h = 7$

Find the dimensions of each rectangle.

Rectangle A

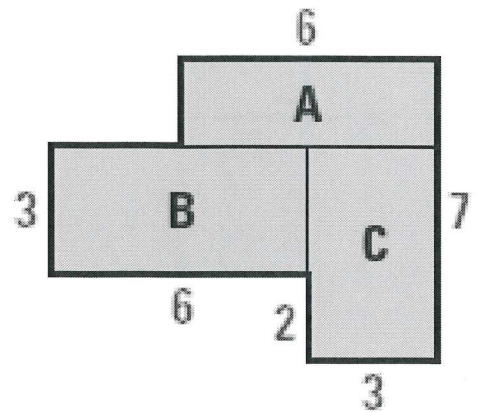
b = 6 h = 2

Rectangle B

b = 6 h = 3

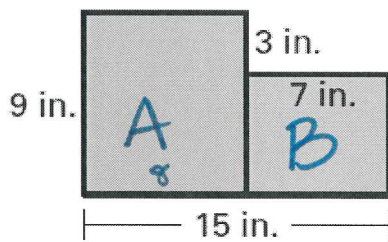
Rectangle C

b = 3 h = 5



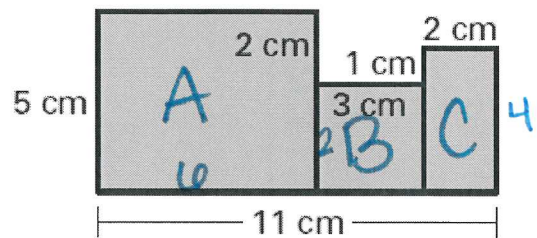
Find the area of the polygon made up of rectangles.

a) A = 114 in²



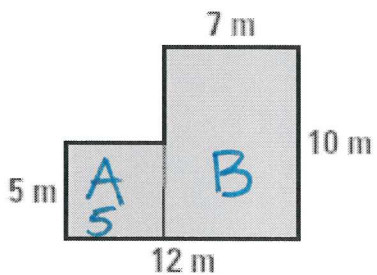
A: $9(8) = 72$
 B: $7(6) = 42$
114

b) A = 44 cm²



A: $5(6) = 30$
 B: $3(2) = 6$
 C: $2(4) = 8$
44

c) A = 115 m²

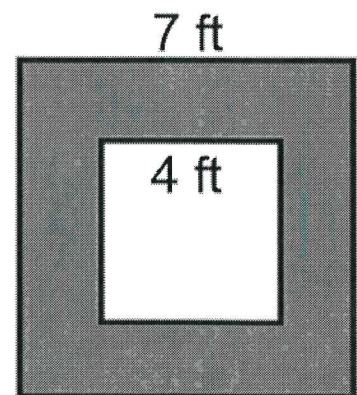


A: $5(5) = 25$
 B: $7(10) = 70$
115

Each figure to the right is a square. Find just the shaded area.

A = 33 ft²

outer \square : $7^2 = 49$
 inner \square : $4^2 = 16$
33

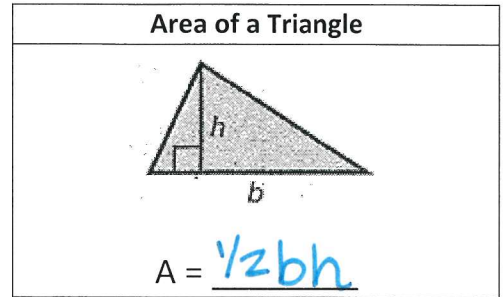


8.4 Area of Triangles

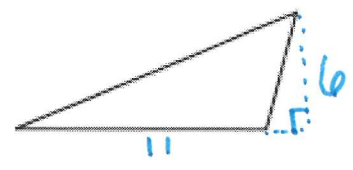
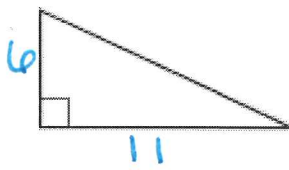
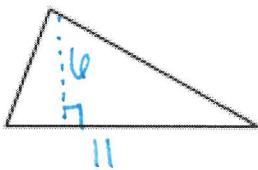
Goal: Find the area of triangles.

Height of a triangle: the perpendicular segment from a vertex to the line containing the opposite side called the base

*The height and the base must make a right angle.

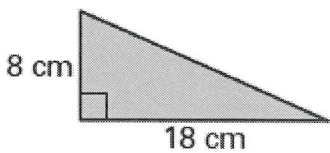


A triangle has a base of 11 and a height of 6. Label each triangle accordingly.



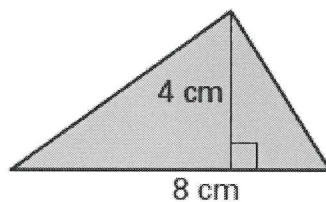
Find the area of the triangle. Label your answer

a) $A = \underline{72 \text{ cm}^2}$



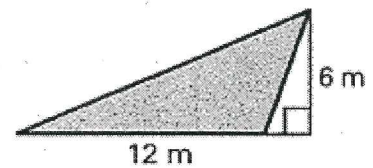
$A = \frac{1}{2}(18)(8)$

b) $A = \underline{16 \text{ cm}^2}$



$A = \frac{1}{2}(8)(4)$

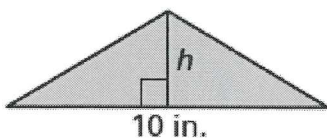
c) $A = \underline{36 \text{ m}^2}$



$A = \frac{1}{2}(12)(6)$

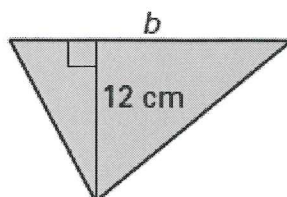
A gives the area of the rectangle. Find the missing side length. Label your answer.

a) $h = \underline{3 \text{ in}}$
 $A = 15 \text{ in.}^2$



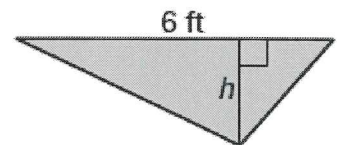
$15 = \frac{1}{2}(10)h$
 $15 = 5h$
 $\frac{15}{5} = \frac{5h}{5}$
 $h = 3$

b) $b = \underline{21 \text{ cm}}$
 $A = 126 \text{ cm}^2$



$126 = \frac{1}{2}b(12)$
 $126 = 6b$
 $\frac{126}{6} = \frac{6b}{6}$
 $b = 21$

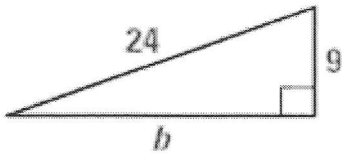
c) $h = \underline{2 \text{ ft}}$
 $A = 6 \text{ ft}^2$



$6 = \frac{1}{2}(6)h$
 $6 = 3h$
 $\frac{6}{3} = \frac{3h}{3}$
 $h = 2$

Use the Pythagorean Theorem to find the missing side, then find the area. Label your answer.

a) $b = \underline{22.2}$
 $A = \underline{99.9 \text{ units}^2}$

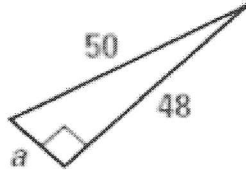


$$9^2 + b^2 = 24^2$$

$$b = 22.2$$

$$A = \frac{1}{2}(22.2)(9)$$

b) $a = \underline{14}$
 $A = \underline{336 \text{ units}^2}$

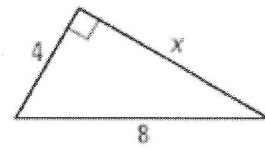


$$a^2 + 48^2 = 50^2$$

$$a = 14$$

$$A = \frac{1}{2}(14)(48)$$

c) $x = \underline{6.9}$
 $A = \underline{13.8 \text{ units}^2}$



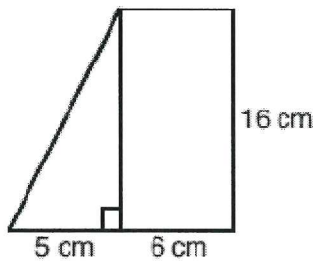
$$4^2 + x^2 = 8^2$$

$$x = 6.9$$

$$A = \frac{1}{2}(4)(6.9)$$

Find the area of each compound shape.

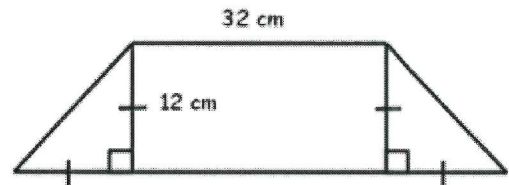
a) $A = \underline{132 \text{ cm}^2}$



$$\Delta: \frac{1}{2}(5)(16) = 40$$

$$\square: 6(16) = \frac{96}{132}$$

b) $A = \underline{528 \text{ cm}^2}$



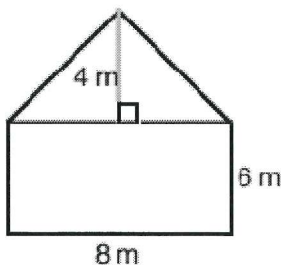
$$\Delta: \frac{1}{2}(12)(12) = 72$$

$$\Delta: \frac{1}{2}(12)(12) = 72$$

$$\square: 12(32) = 384$$

$$528$$

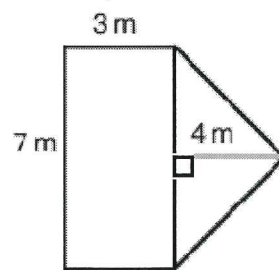
c) $A = \underline{64 \text{ m}^2}$



$$\Delta: \frac{1}{2}(8)(4) = 16$$

$$\square: 6(8) = \frac{48}{64}$$

d) $A = \underline{35 \text{ m}^2}$

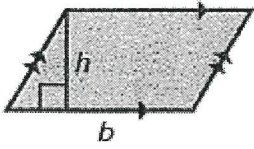
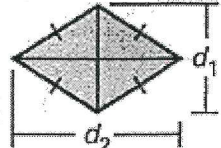


$$\Delta: \frac{1}{2}(3)(4) = 6$$

$$\square: 3(7) = \frac{21}{35}$$

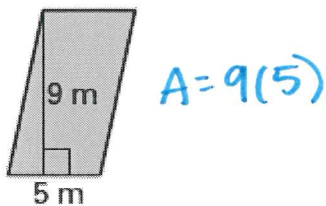
8.5 Area of Parallelograms

Goal: Find the area of parallelograms.

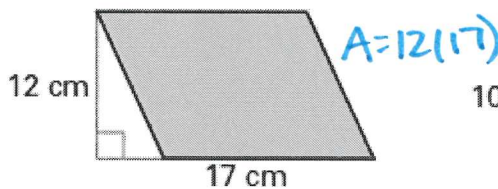
Area of a Parallelogram	Area of a Rhombus
 <p style="text-align: center;">$A = bh$</p>	 <p style="text-align: center;">$A = \frac{1}{2}d_1d_2$</p>

Find the area of the parallelogram.

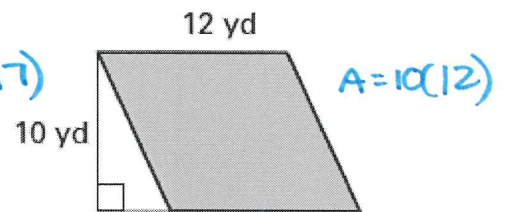
a) $A = 45 \text{ m}^2$



b) $A = 204 \text{ cm}^2$



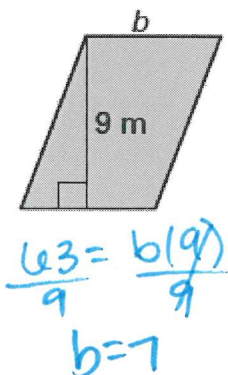
c) $A = 120 \text{ yd}^2$



A gives the area of the parallelogram. Find the missing measure.

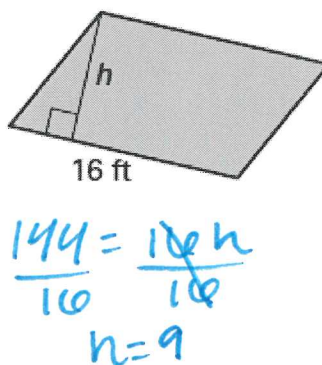
a) 7 m

$A = 63 \text{ m}^2$



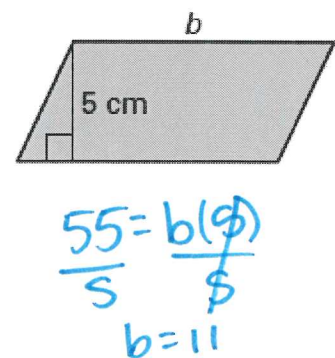
b) 9 ft

$A = 144 \text{ ft}^2$



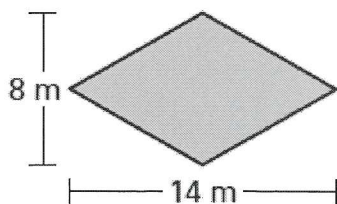
c) 11 cm

$A = 55 \text{ cm}^2$



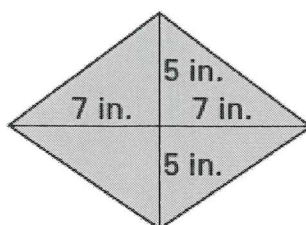
Find the area of the rhombus.

a) $A = 57 \text{ m}^2$



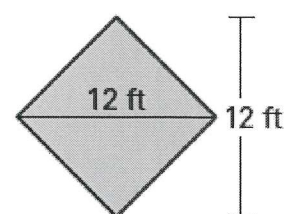
$A = \frac{1}{2}(8)(14)$

b) $A = 70 \text{ in}^2$



$A = \frac{1}{2}(10)(14)$

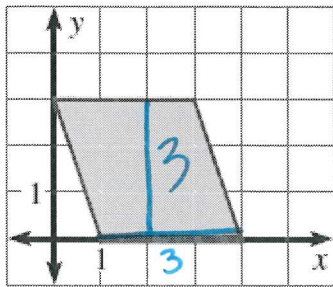
c) $A = 72 \text{ ft}^2$



$A = \frac{1}{2}(12)(12)$

Find the area of each parallelogram.

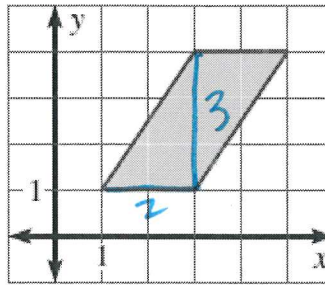
a) $A = 9 \text{ units}^2$



b

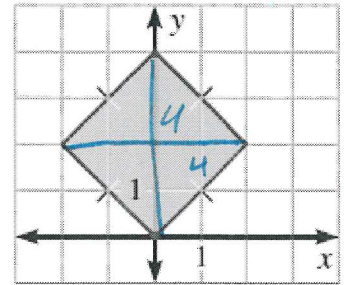
$A = 3(3) = 9$

b) $A = 6 \text{ units}^2$



$A = 2(3) = 6$

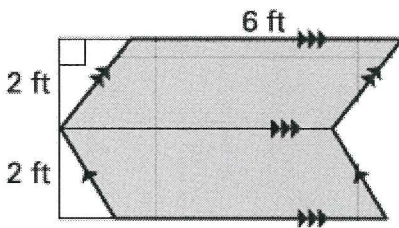
c) $A = 8 \text{ units}^2$



$A = \frac{1}{2}(4)(4)$

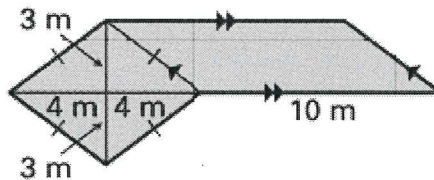
Find the area of each compound shape.

a) $A = 24 \text{ ft}^2$



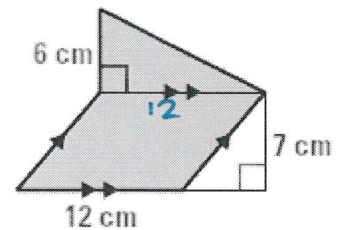
$\square: 2(6) = 12$
 $\square: 2(6) = \frac{12}{24}$

b) $A = 54 \text{ m}^2$



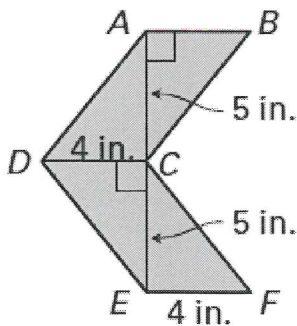
$\square: 10(3) = 30$
 $\diamond: \frac{1}{2}(8)(6) = \frac{24}{54}$

c) $A = 120 \text{ cm}^2$



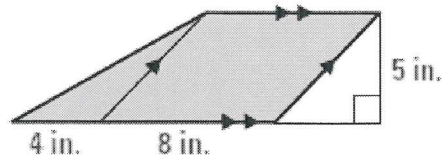
$\triangle: \frac{1}{2}(12)(6) = 36$
 $\square: 12(7) = 84$

d) $A = 40 \text{ in}^2$



$\square: 4(5) = 20$
 $\square: 4(5) = \frac{20}{40}$

e) $A = 50 \text{ in}^2$



$\square: 8(5) = 40$
 $\triangle: \frac{1}{2}(4)(5) = \frac{10}{50}$

8.6 Area of Trapezoids

Goal: Find the area of trapezoids.

Complete each statement with *always*, *sometimes*, or *never*.

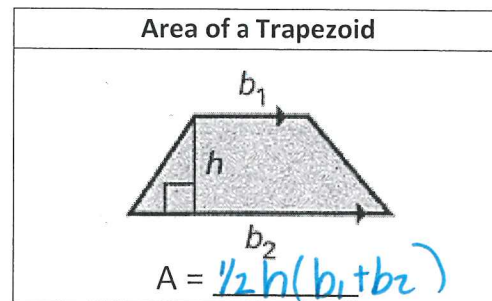
The bases of the trapezoid are always parallel.

The bases of the trapezoid are never congruent.

The bases of a trapezoid are always sides of the trapezoid.

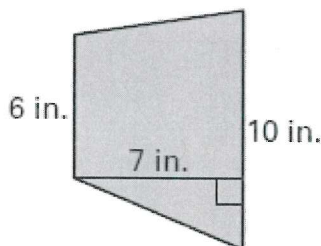
The height of a trapezoid is Sometimes a side of the trapezoid.

The height of a trapezoid is always perpendicular to both bases.



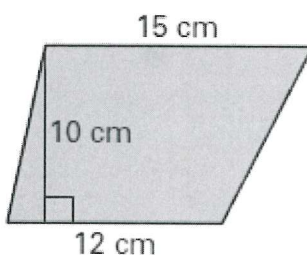
Find the area of the trapezoid.

a) $A = 56 \text{ in}^2$



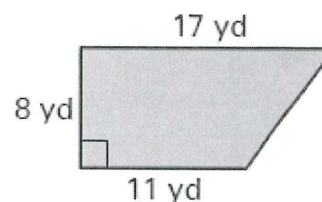
$A = \frac{1}{2}(7)(6 + 10)$

b) $A = 135 \text{ cm}^2$



$A = \frac{1}{2}(10)(12 + 15)$

c) $A = 112 \text{ yd}^2$

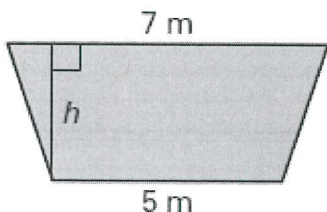


$A = \frac{1}{2}(8)(11 + 17)$

A gives the area of the trapezoid. Find the missing measure.

a) $h = 3 \text{ m}$

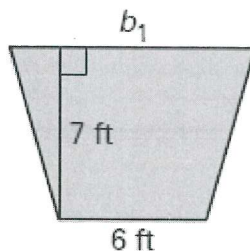
$A = 18 \text{ m}^2$



$18 = \frac{1}{2}h(5 + 7)$
 $18 = \frac{1}{2}h(12)$
 $18 = 6h$

b) $b_1 = 10 \text{ ft}$

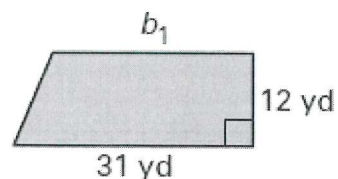
$A = 56 \text{ ft}^2$



$56 = \frac{1}{2}(7)(b_1 + 6)$
 $56 = 3.5(b_1 + 6)$
 $16 = b_1 + 6$

c) $b_1 = 26 \text{ yd}$

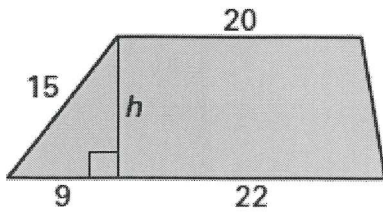
$A = 342 \text{ yd}^2$



$342 = \frac{1}{2}(12)(31 + b_1)$
 $342 = 6(31 + b_1)$
 $57 = 31 + b_1$

Find the height of the trapezoid using the Pythagorean Theorem. Then find the area of the trapezoid.

a) $h = \underline{12}$
 $A = \underline{300 \text{ units}^2}$

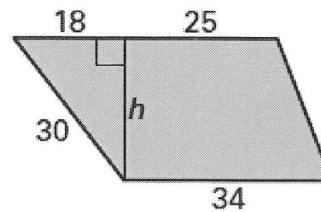


$$9^2 + h^2 = 15^2$$

$$h = 12$$

$$A = \frac{1}{2}(12)(20+22) = 300$$

b) $h = \underline{24}$
 $A = \underline{924 \text{ units}^2}$



$$h^2 + 18^2 = 30^2$$

$$h = 24$$

$$A = \frac{1}{2}(24)(34+18) = 924$$

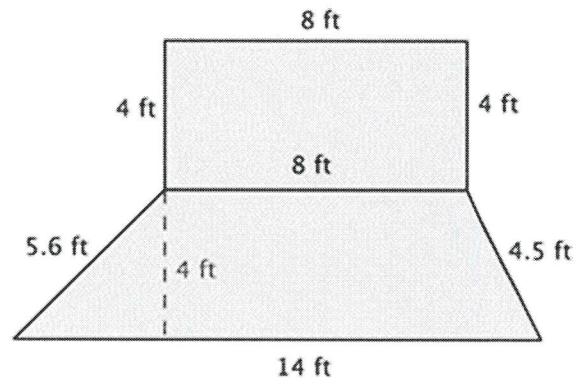
Find the area of the composite figures.

a) $A = \underline{76 \text{ ft}^2}$

$$\square : 4(8) = 32$$

$$\triangle : \frac{1}{2}(4)(14+8) = 44$$

$$76$$

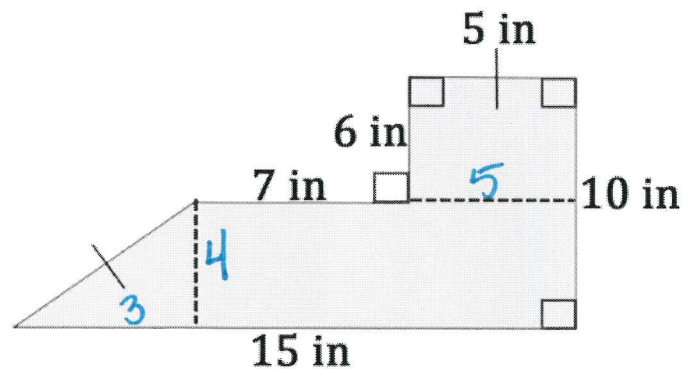


b) $A = \underline{84 \text{ in}^2}$

$$\square : 5(6) = 30$$

$$\triangle : \frac{1}{2}(4)(15+7) = 54$$


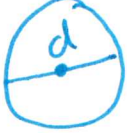



$$84$$



8.7 Circumference and Area of Circles

Goal: Find the circumference and area of circles.

Circle: a set of all points in a plane that are the same distance from a given point, called the center of the circle.

Radius: the distance from the <u>center</u> to a point on the circle	
Diameter: the distance <u>across</u> the circle, through the center	
Circumference: the distance <u>around</u> the circle ↳ perimeter of a circle	
Central angle: an angle whose <u>vertex</u> is the center of the circle	
Sector: a region of a circle determined by two <u>radii</u> and a part of the circle	

Circumference of a Circle	Area of a Circle
$C = \underline{2\pi r}$ or $C = \underline{\pi d}$	$A = \underline{\pi r^2}$

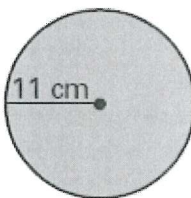
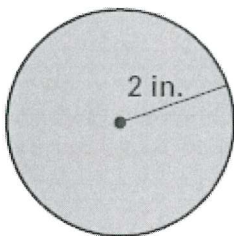
Find the circumference of the circle. The find the area. Round your answer to the nearest tenth.

a) $C = \underline{12.6 \text{ in}}$
 $A = \underline{12.6 \text{ in}^2}$

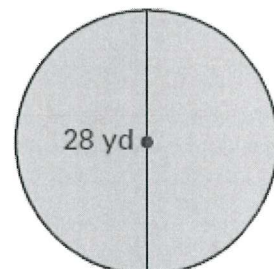
b) $C = \underline{69.1 \text{ cm}}$
 $A = \underline{380.1 \text{ cm}^2}$

c) $C = \underline{88 \text{ yd}}$
 $A = \underline{615.8 \text{ yd}^2}$

$C = 2\pi r$
 $A = \pi r^2$



$C = 2\pi 11$
 $A = \pi 11^2$



$C = 28\pi$
 $A = \pi 14^2$

The area of the circle is given. Find the radius.

a) $r = 4 \text{ cm}$

$A = 50 \text{ cm}^2$

$$\frac{50}{\pi} = \pi r^2$$

$$\frac{50}{\pi} \div \pi = \frac{\pi r^2}{\pi}$$

$$\sqrt{15.9} = \sqrt{r^2}$$

b) $r = 12 \text{ in}$

$A = 452 \text{ in}^2$

$$\frac{452}{\pi} = \pi r^2$$

$$\frac{452}{\pi} \div \pi = \frac{\pi r^2}{\pi}$$

$$\sqrt{143.88} = \sqrt{r^2}$$

c) $r = 3 \text{ ft}$

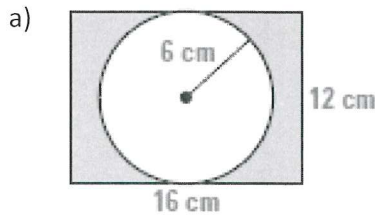
$A = 28 \text{ ft}^2$

$$\frac{28}{\pi} = \pi r^2$$

$$\frac{28}{\pi} \div \pi = \frac{\pi r^2}{\pi}$$

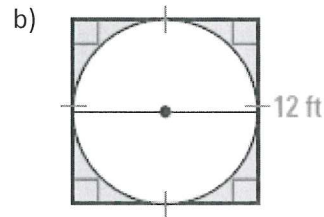
$$\sqrt{8.91} = \sqrt{r^2}$$

Find the area of the shaded region.



A of \square : $16(16) = 256$
 A of \circ : $\pi 6^2 = 113.1$

$256 - 113.1 = 142.9$
142.9 cm²



A of \square : $12(12) = 144$
 A of \circ : $\pi 6^2 = 113.1$

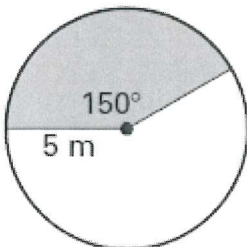
$144 - 113.1 = 30.9$
30.9 ft²

Area of a Sector

$$\frac{\text{degrees}}{360^\circ} = \frac{\text{Area of Sector (x)}}{\text{Area of Circle}}$$

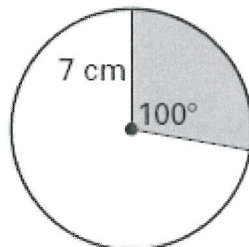
Find the area of the sector. Round your answer to the nearest tenth.

a) $A = 32.7 \text{ m}^2$



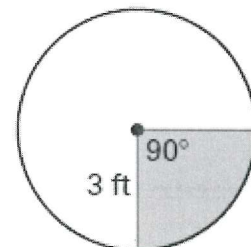
$$\frac{150}{360} = \frac{x}{\pi 5^2}$$

b) $A = 42.8 \text{ cm}^2$



$$\frac{100}{360} = \frac{x}{\pi 7^2}$$

c) $A = 7.1 \text{ ft}^2$



$$\frac{90}{360} = \frac{x}{\pi 3^2}$$